## Claims:

1. A compound having the formula:

or solvate thereof,

R is alkyl, aryl, or allyl, each having less than 25 carbons and wherein R' is alkyl, aryl, allyl, each having less than 25 carbons or H.

2. The compound of claim 1 wherein R or R' further comprise at least one functional group selected from the group consisting of esters, ethers, amides, phosphates, sulfonates, sulfate, amidines, phosphonates, or carboxylate functional groups.

## 3. A compound having the formula:

or solvate thereof, wherein

R is alkyl, aryl, or allyl, each having less than 25 carbons and R is alkyl, aryl, allyl, each having less than 25 carbons or H.

- 4. The compound of claim 3 wherein R or R further comprise at least one functional group selected from the group consisting of esters, ethers, amides, phosphates, sulfonates, sulfate, amidines, phosphonates, amine, hydroxyl, or carboxylate functional groups.
- 5. The compound of claim 3 wherein R or R' is ethyl.

6. An assay reagent comprising an effective amount of

wherein R is an alkyl, aryl, allyl, carbonyl, carboxylate, amide, ester, phosphonate, phosphate, sulfonate, sulfate, amidine, carbamate; and R' is an alkyl, aryl, allyl, carbonyl, carboxylate, amide, ester, phosphonate, phosphate, sulfonate, sulfate, amidine, carbamate, or H.

- 7. A method of determining the presence of a macrophilin-binding pharmaceutical composition in a sample comprising: adding a binding competitor of the formula of claim 1 to the sample; adding a receptor that binds to the pharmaceutical but not significantly to the binding competitor; detecting the receptor-pharmaceutical composition and determining the amount of the pharmaceutical.
- 8. The method of claim 7 wherein the pharmaceutical is rapamycin (sirolimus), everolimus or tacrolimus (FK506).

- 9. A method of determining the presence of a macrophilin-binding pharmaceutical composition in a sample comprising: adding a binding competitor of the formula of claim 3 to the sample; adding a receptor that binds to the pharmaceutical but not significantly to the binding competitor; detecting the receptor-pharmaceutical composition and determining the amount of the pharmaceutical.
- 10. The method of claim 9 wherein the pharmaceutical is rapamycin (sirolimus), everolimus or tacrolimus (FK506).
- 11. The method of claim 10 wherein R or R' is ethyl.
- 12. A method of determining the presence of a macrophilin-binding pharmaceutical composition in a sample comprising: adding a binding competitor of the formula of claim 6 to the sample; adding a receptor that binds to the pharmaceutical but not significantly to the binding competitor; detecting the receptor-pharmaceutical composition and determining the amount of the pharmaceutical.
- 13. The method of claim 12 wherein the pharmaceutical is rapamycin, (sirolimus), everolimus or tacrolimus (FK506).